

# PATENT ABSTRACTS OF JAPAN

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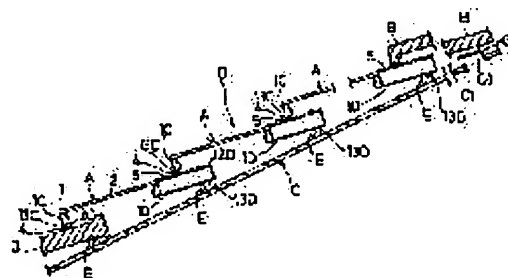
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(54) SOLAR-CELL HOLDING TILE AND CONNECTING STRUCTURE OF SOLAR-CELL HOLDING TILE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a solar-cell holding tile, which can be positioned on a sheathing roof board by utilizing a batten for a holding tile and by which installation operation efficiency is improved and the waterproofness of the connecting section of the tile is attained, and connecting structure to a roof.

SOLUTION: Retaining piece 13D for retaining to battens E for holding tiles are projected from the ridge-side horizontal frame materials 1D of cell holding frames, and drip caps, to which elastic waterproofing materials are installed, are disposed to the lower sections of the joining sections of the side end sections of the solar-cell holding tiles and the side end sections of roofing tiles, and brought into contact elastically with the hanging sections of the overlapping pieces of cell-holding tile side end sections. Waterproof sheets 4 and 5 are mounted on the undersides of the edge sections of eaves of the solar-cell holding tiles and the top face sides of the ridge side end sections, and the upper and lower solar-cell holding tiles are joined mutually.



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the junction structure of the photovoltaic cell maintenance tile used for installing the solar-battery unit which generates power by sunlight, and a photovoltaic cell maintenance tile.

[0002]

[Description of the Prior Art] Although a photovoltaic cell maintenance tile is fixed by \*\*\*\* on the sarking to which the gauge lath was fixed when thatching a photovoltaic cell maintenance tile on sarking, before a \*\*\*\* stop, a photovoltaic cell maintenance tile must be positioned on sarking. However, since the conventional photovoltaic cell maintenance tile was not equipped with the means for positioning, it needed to carry out as [ slip / from the roof which the operator pressed down the photovoltaic cell maintenance tile by hand, and inclined ], and since the solar-battery unit consisted of dozens of photovoltaic cell maintenance tiles, it had the trouble that the installation working capacity of a solar-battery unit fell. Moreover, in the case of mold goods, such as aluminum, there was a problem that wore out the lap section of the photovoltaic cell maintenance tile of an upper case and the lower berth, and a waterproofing function fell by telescopic motion of the cel maintenance frame accompanying a temperature change in a cel maintenance frame. Furthermore, although the junction to a photovoltaic cell maintenance tile and the usual roofing tile compares and compares the side edge section of a photovoltaic cell maintenance tile, and the side edge section of a roofing tile and he is trying to fill up the clearance between parts with a sealing material, sufficient waterproofing effectiveness was not acquired but it had the problem that the amount of [ of a photovoltaic cell maintenance tile and the usual roofing tile ] joint became a weak spot on waterproofing.

[0003]

[Problem(s) to be Solved by the Invention] The place which this invention is made in view of the above-mentioned conventional technical problem, and is made into the purpose of this invention Even if an operator does not hold a photovoltaic cell maintenance tile, can position on sarking using a gauge lath and the efficiency of installation of a solar-battery unit improves. Moreover, the joint of a photovoltaic cell maintenance tile offers the junction structure of the solar-battery unit to the photovoltaic cell maintenance tile and roof which do not become a weak spot on waterproofing, without a waterproofing function falling by wear of a cel maintenance frame.

[0004]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the photovoltaic cell maintenance tile of claim 1 is characterized by protruding caudad on a cel maintenance frame the piece of hanging for hooking a photovoltaic cell on a gauge lath in the photovoltaic cell maintenance tile which attaches and changes from the ridge side transversal frame material of a cel maintenance frame.

[0005] The photovoltaic cell maintenance tile of claim 2 is characterized by arranging in the inferior-surface-of-tongue section of the eaves side transversal frame material of a cel maintenance frame the tarpaulin which serves as prevention of wear by contact of tiles in a photovoltaic cell maintenance tile according to claim 1.

[0006] The photovoltaic cell maintenance tile of claim 3 is characterized by setting up the dimension of a cel maintenance frame so that it may become the same as the dimension for two or more roofing tiles installed successively by the longitudinal direction on the roof substrate section in a photovoltaic cell maintenance tile according to claim 1 or 2.

[0007] The junction structure of the photovoltaic cell maintenance tile of claim 4 arranges the waterproofing connector object of the joint of the side edge section of a photovoltaic cell maintenance tile, and the side edge section of a roofing tile which attaches an elastic water blocking material in the top face of the drain board, and grows into it caudad, and is characterized by contacting elastically the side edge section of a photovoltaic cell maintenance tile, and the side edge

section of a roofing tile to the elastic water blocking material of a waterproofing connector object.

[0008] The junction structure of the photovoltaic cell maintenance tile of claim 5 attaches a tarpaulin in the inferior-surface-of-tongue side of the front edge of a photovoltaic cell maintenance tile, and is characterized by joining photovoltaic cell maintenance tiles for the tarpaulin by the side of the front of the photovoltaic cell maintenance tile of an upper case to the ridge side of the photovoltaic cell maintenance tile of the lower berth in piles.

[0009] The junction structure of the photovoltaic cell maintenance tile of claim 6 attaches a tarpaulin in the inferior-surface-of-tongue [ of the front edge of a photovoltaic cell maintenance tile ], and top-face side of the ridge side edge section, respectively, and is characterized by joining photovoltaic cell maintenance tiles for the tarpaulin by the side of the front of the photovoltaic cell maintenance tile of an upper case in piles on the tarpaulin by the side of the ridge of the photovoltaic cell maintenance tile of the lower berth.

[0010]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained according to drawing 1 thru/or drawing 12 . Drawing 1 is [ the X-X sectional view of drawing 1 and drawing 3 of the perspective view of the photovoltaic cell maintenance tile A and drawing 2 ] the Y-Y sectional views of drawing 1 . As shown in drawing 1 , the photovoltaic cell maintenance tile A is constituted by fixing a photovoltaic cell 2 in the cel maintenance frame 1. The cel maintenance frame 1 joins the door-post material 1A and 1B of a pair on either side, eaves side transversal frame material 1C, and ridge side transversal frame material 1D, and changes, and these frame material 1A, 1B, 1C, and 1D is the fabrication article of the hollow of incombustible materials, such as aluminum. Since the cel maintenance frame 1 is formed with the incombustible material, it can protect a photovoltaic cell 2. In addition, fire-resistant synthetic resin and the quasi-noncombustible materials else, such as a metallic material, are also contained in an incombustible material. Moreover, as a photovoltaic cell 2, what cannot be easily influenced of temperature dependence is adopted.

[0011] The form width of the cel maintenance frame 1 is set as the same dimension as the die length when following a longitudinal direction and thatching two or more monotonous tiles (henceforth a roofing tile) B, such as an asbestos cement sheet tile and a metal roof tile, and the vertical dimension and thickness of the cel maintenance frame 1 are set up so that it may become the same as the vertical dimension of a roofing tile B, and a thickness dimension. The form width of the cel maintenance frame 1 is set as about 130cm, the vertical dimension of the cel maintenance frame 1 is set as about 35cm, and the thickness dimension of the cel maintenance frame 1 is set as about 3cm. In addition, the sign L in drawing 1 shows the tile ascent work dimension of the photovoltaic cell maintenance tile A which is the effective length of a tile. As shown in drawing 2 and drawing 3 , the fixed slot 3 is established in the inner circumference side of the cel maintenance frame 1 over the perimeter, and the periphery section of a photovoltaic cell 2 is inserted in this fixed slot 3 through the sealant. The fixed slot 3 is formed by the inner brims 3A and 3B of the vertical pair prepared in the inner circumference side of the cel maintenance frame 1.

[0012] As shown in drawing 2 , eaves side transversal frame material 1C of the cel maintenance frame 1 is hidden from the lower limit of the front section of eaves side transversal frame material body 11C, installs piece 13C, prepares water return 12C in the lower limit of hidden piece 13C, and is constituted, and the tarpaulin 4 is stuck on the inferior surface of tongue of water return 12C. A tarpaulin 4 prevents wear of the top-face section of ridge side transversal frame material 1D of the cel maintenance frame 1 of the photovoltaic cell maintenance tile A by contact to the photovoltaic cell maintenance tile A of the lower berth while preventing contact to the photovoltaic cell maintenance tile A of the lower berth, and permeation of the storm sewage from a part for a joint with the roofing tile B of the lower berth. Especially, wear of the lap part of the photovoltaic cell maintenance tile A of the upper case by telescopic motion of the cel maintenance frame accompanying a temperature change and the lower berth is prevented, and the fall of a waterproofing function is prevented. The tarpaulin 4 is formed in the waterproof packaging which has endurance, abrasion resistance, a water resisting property, and lightfastness, such as elasticity synthetic resin and soft rubber, and the thickness dimension is set as thin meat. When sticking a tarpaulin 4 on the inferior surface of tongue of water return 12C, an adhesives layer may be beforehand formed in the whole surface side of a tarpaulin 4, a tarpaulin 4 may be stuck on the inferior surface of tongue of water return 12C in this adhesives layer, adhesives may be applied to the inferior surface of tongue and tarpaulin 4 of water return 12C in a construction site, and a tarpaulin 4 may be stuck on the inferior surface of tongue of water return 12C. Moreover, a tarpaulin 4 may be formed by applying waterproof packaging, such as elasticity synthetic resin and soft rubber, to the inferior surface of tongue of water return 12C of eaves side transversal frame material 1C.

[0013] As shown in drawing 2 , ridge 12D is set up in the ridge side edge section of the top-face section of ridge side transversal frame material body 11D, ridge side transversal frame material 1D of the cel maintenance frame 1 is caudad turned from the inferior surface of tongue of the posterior part approach part of ridge side transversal frame material

body 11D, it protrudes and piece of hanging 13D is constituted. Piece of hanging 13D is for hooking on the gauge lath E of the roof substrate section C, as shown in drawing 10, and the protrusion length of piece of hanging 13D is set up so that it may become shorter than the height dimension of a gauge lath E. In addition, although piece of hanging 13D is formed covering the overall length of ridge side transversal frame material 1D in the drawing, it does not necessarily need to be formed covering an overall length. The width method of ridge side transversal frame material 1D is large compared with the width method of eaves side transversal frame material 1C, for example, is set as about 9cm.

[0014] As shown in drawing 1 and drawing 3, piece of underlapping 12A is horizontally installed in an inner circumference side from the lower limit by the side of the periphery of door-post material body 11A which has the fixed slot 3, and door-post material 1A of the cel maintenance frame 1 starts at the tip of piece of underlapping 12A, it prepares section 13A and is constituted. Reinforcing rib 14A is prepared in the center of the cross direction by the side of the top face of piece of underlapping 12A, and insertion hole 15A is installed through reinforcing rib 14A. Therefore, as shown in drawing 11, it \*\*\*\*s to this insertion hole 15A, and 6 is inserted in, when the stop of the piece of underlapping 12A is \*\*\*\*\*ed and carried out to the roof substrate section C, it is lost that the conclusion force by \*\*\*\* 6 distributes by reinforcing rib 14A, and concentrates on piece of underlapping 12A near insertion hole 15A, and deformation of piece of underlapping 12A can be prevented.

[0015] As shown in drawing 1 and drawing 3, door-post material 1B of the cel maintenance frame 1 is given at the tip of piece of overlap 12B, it prepares section 13B, and is constituted [ piece of overlap 12B is horizontally installed in an inner circumference side from the upper limit of the lateral surface of door-post material body 11B which has the fixed slot 3, ], and insertion hole 14B is drilled in the end face of piece of overlap 12B.

[0016] Drawing 4 shows the perspective view of the waterproofing connector object 7 which waterproofs a joint with the roofing tile B which adjoins the photovoltaic cell maintenance tile A and this, in the direction of a front, this waterproofing connector object 7 prepares elastic water blocking material 7C, and is constituted in the center of the cross direction on the top face of horizontal plate section 7B of drain board 7A of the shape of a long cross section of L characters, and the water return 7D and 7E is formed in the both ends of drain board 7A.

[0017] As the photovoltaic cell maintenance tile A constituted as mentioned above is shown in drawing 5 thru/or drawing 11, it is fixed with a roofing tile B on the roof substrate section C. Drawing 6 thru/or drawing 8 are the perspective views showing the solar-battery unit D and the construction process of a roofing tile B, drawing 9 is the perspective view showing the condition of having installed the solar-battery unit D in the roof, drawing 10 is drawing of longitudinal section of the roof in which the solar-battery unit D was installed, and drawing 11 is the cross-sectional view of the roof in which the solar-battery unit was installed. Hereafter, installation of the solar-battery unit D with the photovoltaic cell maintenance tile A and the thatching activity of a roofing tile B are explained. First, the roof substrate section C is formed for built up roofing and a color steel plate in piles on sarking. Moreover, [0018] which fixes a doubling piece D to a front side Next, as shown in drawing 5 and drawing 6, the gauge lath E of the roof substrate section C and the cel tie-down plate F are fixed with a fastener. Between the cel tie-down plate F and the gauge lath E just below, the clearance E1 for letting the plus terminal 8 of the electric wire of the photovoltaic cell maintenance tile A pass is formed, and the clearance E2 for letting the minus terminal 9 of the electric wire of the photovoltaic cell maintenance tile A pass is formed between gauge laths E. The cel tie-down plate F is for enlarging the screwing depth of \*\*\*\* 6 and fixing the photovoltaic cell maintenance tile A to the roof substrate section C stably. The sign J in drawing 5 shows the working width of the photovoltaic cell maintenance tile A, and Sign K is Rhine which shows the location of the side edge side of the photovoltaic cell maintenance tile A when thatching the photovoltaic cell maintenance tile A.

[0019] As shown in drawing 10 and drawing 11, before \*\*\*\*ing the photovoltaic cell maintenance tile A and fixing to the roof substrate section C by 6, piece of hanging 13D of the photovoltaic cell maintenance tile A is hooked on a gauge lath E, and the photovoltaic cell maintenance tile A is positioned. It constructs sequentially from a front side like the usual tile, and thatching of this photovoltaic cell maintenance tile A goes. Next, as shown in drawing 11, photovoltaic cell maintenance tile A which adjoin a longitudinal direction mutually is fixed to the roof substrate section C with three screw threads 6 which the insertion holes 15A and 14B of piece of overlap 12B of the door-post material 1A and 1B and piece of underlapping 12A let pass. A screw thread 6 is thrust into the cel tie-down plate F and the roof substrate section C as shown in drawing 11. In addition, a roofing tile B is \*\*\*\*\*ed and it fixes in 6.

[0020] a screw thread 6 is a product made from stainless steel, and covers the non-thread part of the shank of \*\*\*\* 6 with insulating material 6A -- having -- moreover -- the end face of the shank of \*\*\*\* 6 -- rubber packing 6B -- attachment \*\*\*\*\*. As shown in drawing 11, a part of periphery edge of head 6B of the \*\*\*\* 6 which insertion hole 14 of piece of overlap 12B B of door-post material 1B of the cel maintenance frame 1 lets pass has started door-post material body 11B, and it has prevented generating of the concentrated load to piece of overlap 12B by \*\*\*\*ing to

piece of overlap 12B, and binding 6 tight.

[0021] And as shown in drawing 6 , a roofing tile B and the photovoltaic cell maintenance tile A are turned to a ridge side from a front side, and it is attachment \*\*\*\*\*. Moreover, when a part of piece of hanging 13D A of the photovoltaic cell maintenance tile A, i.e., a photovoltaic cell maintenance tile, is thatched in the roof substrate section C, the part corresponding to the clearance E2 between gauge laths E is cut, and the minus terminal 9 of wiring of a photovoltaic cell 2 is derived from this cut section towards a ridge side. In addition, the lap dimension of the photovoltaic cell maintenance tiles A and A of an upper case and the lower berth is set as 7cm thru/or 9cm.

[0022] Next, as shown in drawing 7 and drawing 11 , when a roofing tile B is located in the edge of the photovoltaic cell maintenance tile A, the waterproofing connector object 7 is arranged so that it may be located under the joint of piece of overlap 12B of the photovoltaic cell maintenance tile A, and a roofing tile B. That is, while comparing the edge of the lappet section 13B and the roofing tile B of piece of overlap 12B, elastic water blocking material 7C of the waterproofing connector object 7 is made to contact elastically. Furthermore, it is filled up with a caulking material 10 between lappet section 13B and the roofing tiles B of piece of overlap 12B of the photovoltaic cell maintenance tile A. In addition, as shown in drawing 11 , it is good to be filled up with a caulking material also between door-post material body 11A and the roofing tiles B which have piece of underlapping 12A of the photovoltaic cell maintenance tile A.

[0023] It is a wrap at tarpaulin 5A for junction about a part for the ridge flank of the joint of the photovoltaic cell maintenance tile A which adjoins as shown in drawing 8 , and A. Moreover, it is a wrap at tarpaulin 5A for junction about a part for the ridge flank of the joint of the roofing tile B and the photovoltaic cell maintenance tile A which adjoin a longitudinal direction as shown in drawing 7 . Thus, the photovoltaic cell maintenance tile A and a roofing tile B are attached in the roof substrate section C, and as shown in drawing 9 , installation of the solar-battery unit D is completed. In addition, the sign M in drawing is a ridge.

[0024] If the photovoltaic cell maintenance tiles A and A of an upper case and the lower berth lap as shown in drawing 10 , the tarpaulin 4 of water return 12C of eaves side transversal frame material 1C of the photovoltaic cell maintenance tile A of an upper case will be stuck to the top-face section of ridge side transversal frame material 1D of the cel maintenance frame 1 of the photovoltaic cell maintenance tile A of the lower berth, and will not become a weak spot on waterproofing of the lap section of the photovoltaic cell maintenance tile A of an upper case and the lower berth. Moreover, wear of the photovoltaic cell maintenance tile A can be prevented with a tarpaulin 4. Moreover, as shown in drawing 10 , the clearance between the roofing tiles B located in the lower berth of the photovoltaic cell maintenance tile A and the photovoltaic cell maintenance tile A hides by hidden piece 13C of eaves side transversal frame material 1C.

[0025] As shown in drawing 11 , in the joint of the lateral photovoltaic cell maintenance tile A and a roofing tile B, elastic water blocking material 7C of a caulking material 10 and the waterproofing connector object 7 and three-fold water proofing of drain board 7A are carried out, and the waterproofing function which was excellent in a part for a joint with the edge of the roofing tile B which is easy to serve as a weak spot on waterproofing, especially the amputation stump section of a roofing tile B can be demonstrated. Moreover, as shown in drawing 11 , the dead air space H, I, and P for water return is formed in the joint of photovoltaic cell maintenance tile A which adjoin a longitudinal direction, and the joint of the photovoltaic cell maintenance tile A and a roofing tile B.

[0026] as shown in drawing 10 , finally the electric wire of the photovoltaic cell maintenance tile A is wired from the insertion hole G1 of the attachment \*\*\*\* wiring box G by the roof substrate section C near the ridge in the underpart of the roof. The wiring box G is attached in the mounting hole C1 established in the roof substrate section C.

[0027] In addition, since the photovoltaic cell maintenance tile A is laid, and the solar-battery unit D can be installed in a roof and the photovoltaic cell maintenance tile A is incorporated into a roofing tile B in the same way as thatching a roofing tile B on the roof substrate section C, the beauty which roof original has is not spoiled by the solar-battery unit D.

[0028] Although the gestalt of the above operation explained the case of \*\*\*\*\*, they are other things by which the configuration of the photovoltaic cell maintenance tile A is variously changed according to the method of \*\*\*\*. In addition, the photovoltaic cell maintenance tile A can be attached also in the skin of a curtain wall.

[0029] As the two-dot chain line of drawing 1 , drawing 2 , drawing 3 , drawing 8 , and drawing 10 shows, when a tarpaulin 5 is stuck on the top-face section of ridge side transversal frame material 1D of the cel maintenance frame 1 of the photovoltaic cell maintenance tile A and the photovoltaic cell maintenance tiles A and A of an upper case and the lower berth are piled up If it is made to stick the tarpaulin 4 of water return 12C of eaves side transversal frame material 1C of the photovoltaic cell maintenance tile A of an upper case, and the tarpaulin 5 of ridge side transversal frame material 1D of the photovoltaic cell maintenance tile A of the lower berth, the waterproofing function of the joint of the photovoltaic cell maintenance tile A can be raised further.

[0030] A tarpaulin 5 and tarpaulin 5A for junction are formed like the tarpaulin 4 in the waterproof packaging which has endurance, abrasion resistance, a water resisting property, and lightfastness, such as elasticity synthetic resin and soft rubber, and the thickness dimension is set as thin meat. When sticking tarpaulins 5 and 5A, an adhesives layer may be beforehand formed in the whole surface side of tarpaulins 5 and 5A, tarpaulins 5 and 5A may be stuck in this adhesives layer, and adhesives may be applied to tarpaulins 5 and 5A, and may be stuck in a construction site. Moreover, a tarpaulin 5 may be formed by applying waterproof packaging, such as elasticity synthetic resin and soft rubber, to the top-face section of ridge side transversal frame material 1D.

[0031]

[Effect of the Invention] Since positioning of a photovoltaic cell maintenance tile is attained using a gauge lath by hooking the piece of hanging of the cel maintenance frame 1 on a gauge lath according to the photovoltaic cell maintenance tile of claim 1 as explained above, the back can \*\*\*\*, a stop activity can become easy and the installation working capacity of a solar-battery unit can be raised.

[0032] According to the photovoltaic cell maintenance tile of claim 2, when the photovoltaic cell maintenance tile of an upper case and the photovoltaic cell maintenance tile of the lower berth are joined, a tarpaulin can be made to be placed between joints and the waterproofing function for a joint can be raised. Moreover, since it is avoidable that photovoltaic cell maintenance tiles contact soon, the fall of the waterproofing function by wear of a photovoltaic cell maintenance tile can be prevented.

[0033] According to the photovoltaic cell maintenance tile of claim 3, by thatching one photovoltaic cell maintenance tile Can perform the thatching activity for two or more roofing tiles, can raise the efficiency of installation of a solar-battery unit further, and since the vertical dimension of a photovoltaic cell maintenance tile is the same as the vertical dimension of a roofing tile Rhine of the longitudinal direction of a roof does not break off with a photovoltaic cell maintenance tile, and a sense of togetherness with a roofing tile can be pulled out, a roof format is not limited to a gable, either, but various roof formats can be adopted.

[0034] According to the junction structure of the photovoltaic cell maintenance tile of claim 4, in a part for the joint of a photovoltaic cell maintenance tile and a roofing tile, waterproofing of a duplex can be performed at least and the weak spot on waterproofing of the amount of [ of a photovoltaic cell maintenance tile and a roofing tile ] joint does not become with the drain board and the elastic water blocking material of a waterproofing connector object.

[0035] According to the junction structure of the photovoltaic cell maintenance tile of claim 5, the waterproofing function for a joint of the tile of an upper case and the lower berth can be raised, and the fall of the waterproofing function by wear of a tile can be prevented.

[0036] According to the junction structure of the photovoltaic cell maintenance tile of claim 6, since tarpaulins contact in a part for the joint of the photovoltaic cell maintenance tile of the lower berth and an upper case, a part for the joint of the photovoltaic cell maintenance tile of the lower berth and an upper case can be stuck, and a waterproofing function can be raised.

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CLAIMS

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[Claim(s)]

[Claim 1] The photovoltaic cell maintenance tile characterized by protruding caudad on a cel maintenance frame the piece of hanging for hooking a photovoltaic cell on a gauge lath in the photovoltaic cell maintenance tile which attaches and changes from the ridge side transversal frame material of a cel maintenance frame.

[Claim 2] The photovoltaic cell maintenance tile according to claim 1 characterized by arranging in the inferior-surface-of-tongue section of the eaves side transversal frame material of a cel maintenance frame the tarpaulin which serves as prevention of wear by contact of tiles.

[Claim 3] The photovoltaic cell maintenance tile according to claim 1 or 2 characterized by setting up the dimension of a cel maintenance frame so that it may become the same as the dimension for two or more roofing tiles installed successively by the longitudinal direction on the roof substrate section.

[Claim 4] Junction structure of the photovoltaic cell maintenance tile characterized by having arranged the waterproofing connector object of the joint of the side edge section of a photovoltaic cell maintenance tile, and the side edge section of a roofing tile which attaches an elastic water blocking material in the top face of the drain board, and grows into it caudad, and contacting elastically the side edge section of a photovoltaic cell maintenance tile, and the side edge section of a roofing tile to the elastic water blocking material of a waterproofing connector object.

[Claim 5] Junction structure of the photovoltaic cell maintenance tile characterized by having attached the tarpaulin in the inferior-surface-of-tongue side of the front edge of a photovoltaic cell maintenance tile, and joining photovoltaic cell maintenance tiles for the tarpaulin by the side of the front of the photovoltaic cell maintenance tile of an upper case to the ridge side of the photovoltaic cell maintenance tile of the lower berth in piles.

[Claim 6] Junction structure of the photovoltaic cell maintenance tile characterized by having attached the tarpaulin in the inferior-surface-of-tongue [ of the front edge of a photovoltaic cell maintenance tile ], and top-face side of the ridge side edge section, respectively, and joining photovoltaic cell maintenance tiles for the tarpaulin by the side of the front of the photovoltaic cell maintenance tile of an upper case in piles on the tarpaulin by the side of the ridge of the photovoltaic cell maintenance tile of the lower berth.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the perspective view of the photovoltaic cell maintenance tile in which the gestalt of operation of this invention is shown.

[Drawing 2] It is the X-X expanded sectional view of drawing 1 .

[Drawing 3] It is the Y-Y expanded sectional view of drawing 3 .

[Drawing 4] It is the perspective view of the waterproofing connector object used for the junction structure of a photovoltaic cell maintenance tile which shows the gestalt of operation of this invention.

[Drawing 5] It is the perspective view showing the construction process of a solar-battery unit.

[Drawing 6] It is the perspective view showing the construction process of a solar-battery unit.

[Drawing 7] It is the perspective view showing the construction process of a solar-battery unit.

[Drawing 8] It is the perspective view showing a part for the joint of photovoltaic cell maintenance tiles.

[Drawing 9] It is the perspective view showing the roof in which the solar-battery unit was installed.

[Drawing 10] It is drawing of longitudinal section of the roof in which the solar-battery unit was installed.

[Drawing 11] It is the cross-sectional view of the roof in which the solar-battery unit was installed.

[Description of Notations]

A Photovoltaic cell maintenance tile

1 Cel Maintenance Frame

1A Door-post material

11A Door-post material body

12A The piece of underlapping

13A Standup section

14A Reinforcing rib

15A The insertion hole of a screw thread

1B Door-post material

11B Door-post material body

12B The piece of overlap

13B The lappet section of the piece of overlap

14B The insertion hole of a screw thread

1C Eaves side transversal frame material

11C Eaves side transversal frame material body

12C Water return

13C A hidden piece

1D Ridge side transversal frame material

11D Ridge side transversal frame material body

12D Ridge

13D The piece of hanging

2 Photovoltaic Cell

3 Fixed Slot

4 Tarpaulin

5 Tarpaulin

6 Screw Thread

7 Waterproofing Connector Object

7A Drain board  
7C Elastic water blocking material  
10 Caulking Material  
B Roofing tile  
C Roof substrate section  
D Solar-battery unit  
E Gauge lath

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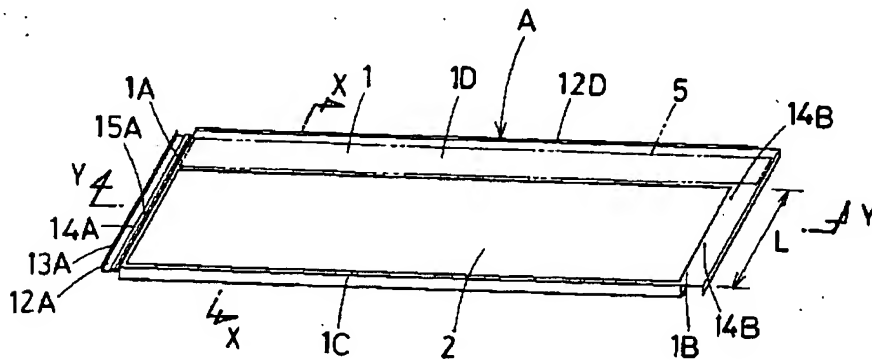
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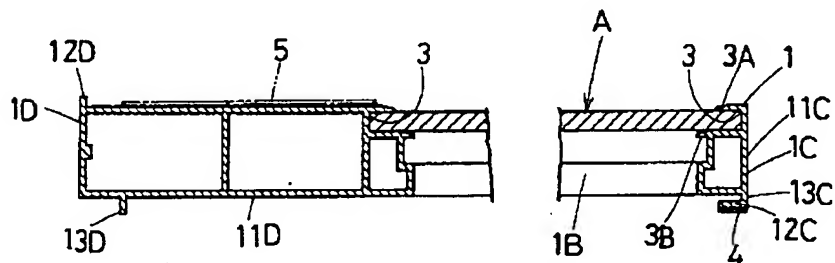
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

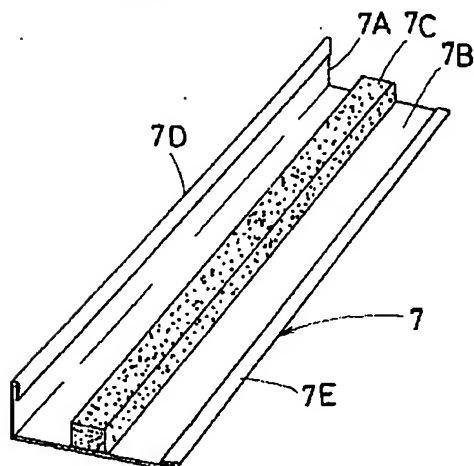
[Drawing 1]



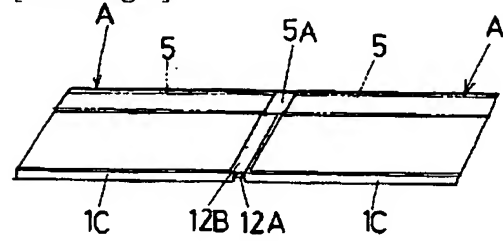
[Drawing 2]



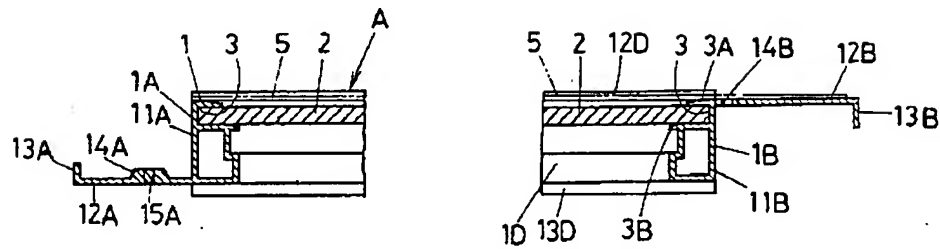
[Drawing 4]



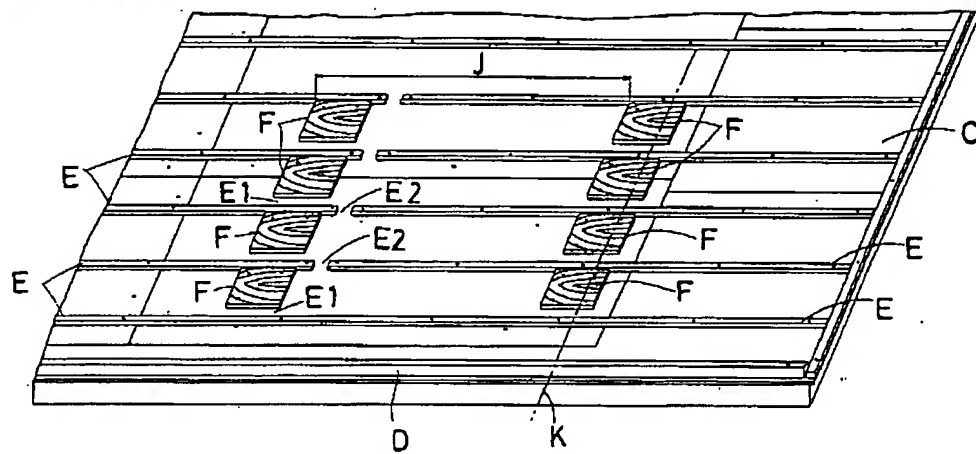
[Drawing 8]



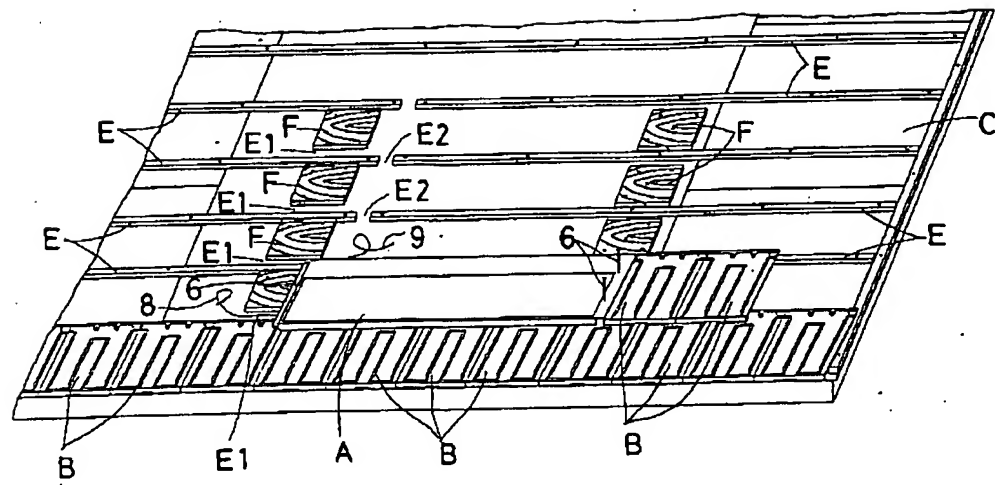
[Drawing 3]



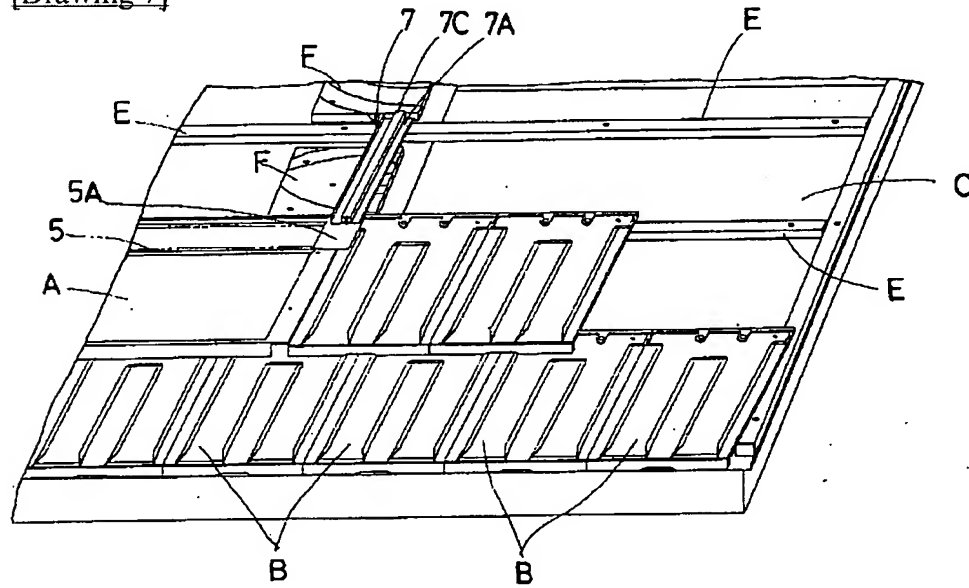
[Drawing 5]



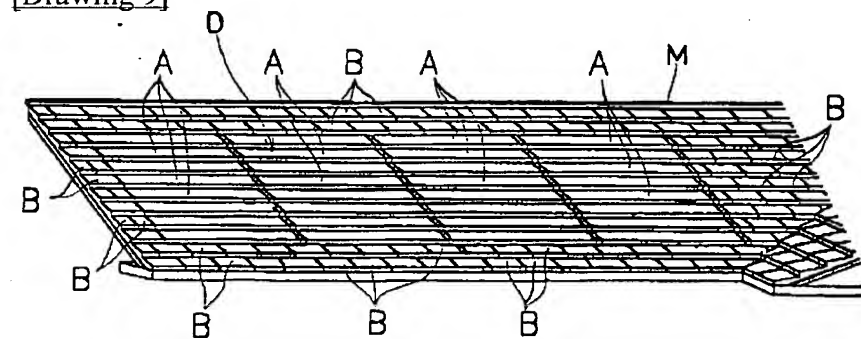
[Drawing 6]



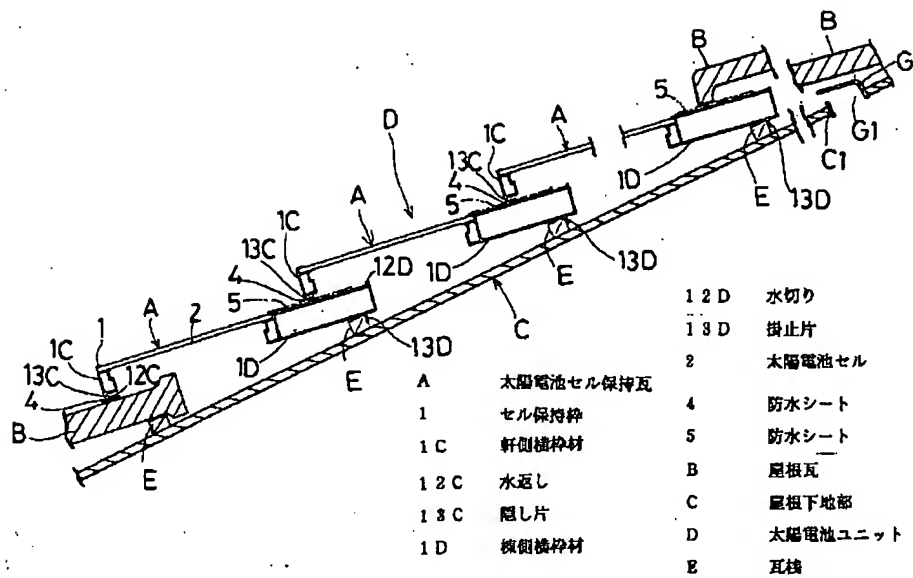
[Drawing 7]



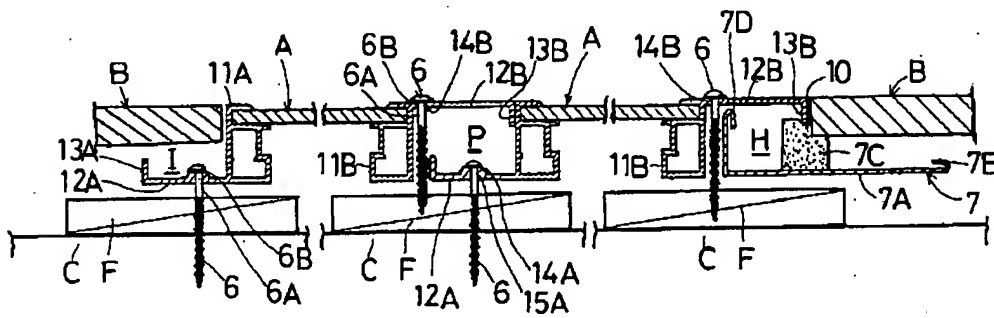
[Drawing 9]



[Drawing 10]



[Drawing 11]



[Translation done.]